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Attorney Docket No. P2041

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**CERTIFICATE OF EXPRESS MAILING**

I hereby certify that this paper and the documents and/or fees referred to as attached therein are being deposited with the United States Postal Service on August 30, 2000 in an envelope as "Express Mail Post Office to Addressee" service under 37 CFR § 1.10, Mailing Label Number EL391268778US, addressed to Assistant Commissioner of Patents, Washington, DC 20231.

  
Steve S. Cha

**UTILITY PATENT APPLICATION TRANSMITTAL (37 CFR § 1.53(b))**

Assistant Commissioner for Patents  
Box Patent Application  
Washington, D.C. 20231

Transmitted herewith for filing is the patent application under 37 CFR § 1.53(b) in the name of inventor(s) of:

Young-Soo Park

For: METHOD OF INFORMING CHARGING DATA TO MOBILE TERMINAL IN MOBILE RADIO COMMUNICATION SYSTEM

Enclosed are:

**Application Elements:**

- ☒ 2 copies each of 4 sheets of informal drawing(s).
- ☒ Assignment of the invention to: SAMSUNG ELECTRONIC CO., LTD.
- ☒ Specification, Claims, and Abstract: Nr. of sheets: 16
- ☒ A copy of combined declaration and power of attorney

**Accompanying Application Parts:**

- ☒ A check\* 1159 in the amount of \$690.00 for filing fee
- ☒ A Return Receipt Postcard
- ☒ Assignment and Assignment Recordation Cover Sheet (recording fee of \$40.00 enclosed)

08/30/00

jcs80 U.S. PT

☒ Claim of priority under 35 U.S.C. §119 and a copy of certified Korean Patent Application.

☐ Information disclosure statements: Nr. of sheets: 3

☐ Preliminary Amendment

☐ Small Entity Statement(s)

☐ Other:

The filing fee has been calculated as shown below (37 CFR §1.16):

For:	No. Filed	No.Extra	Rate(Small Entity)	Fee(Small Entity)
Basic Fee	20 claims			\$ 690.00
Total Claims	9 claims - 20 =	0	\$18(\$9)/claim	\$ 0.00
Independent Claims	2 claims - 3 =	0	\$78(39)/claim	\$ 0.00
Multiple Dep.Claims			\$130(65)/claim	\$ 0.00
Total Filing Fee				\$ 690.00

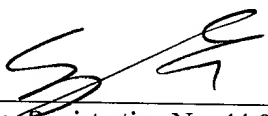
General Authorization for Petition for Extension of Time (37 CFR §1.136)

Applicant hereby make and generally authorize any Petitions for Extensions of Time as may be needed for any subsequent filings.

Should the enclosed check become lost or detached from the file, Assistant Commissioner is authorized to charge our Deposit Account No. 50-1005 and advise the undersigned attorney accordingly. Also, should the enclosed check be deemed to be deficient or excessive in payment, the Commissioner is authorized to charge or credit our deposit account and notify the undersigned attorney of any such transaction.

In view of the above, it is respectfully requested that this application be accorded a filing date pursuant to 37 C.F.R. §1.53(b).

Mailed: August 30, 2000

  
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PATENT, TRADEMARK OFFICE

# **METHOD OF INFORMING CHARGING DATA TO A MOBILE TERMINAL IN A MOBILE RADIO COMMUNICATION SYSTEM**

## **CLAIM OF PRIORITY**

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This application makes reference to and claims all the benefit accruing under 35 U.S.C. Section 119 from an application entitled, "Method of Informing Charging Data to Mobile Terminal in Mobile Radio Communication System, filed in the Korean Patent Office on September 11, 1999 and there duly assigned Serial No. 1999-38856.

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## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

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The present invention relates to a method for informing charging data to a mobile terminal in a code division multiple access (CDMA) type or a time division multiple access (TDMA) type mobile radio communication system which enables a mobile terminal subscriber to immediately confirm, via his/her mobile terminal telephone, charge status that is calculated and managed by a charging center.

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### **2. Description of the Related Art**

Mobile communication system technology is widely used by individuals, automobiles, ships, trains, airplanes, etc. Specifically, the mobile communication system includes mobile telephones, such as portable telephones or telephones for vehicles, harbor

telephones, telephones for airplanes, and mobile public telephones installed in the excursion ships, the express buses, etc. The mobile communication system also includes radio pagers, radio telephones, satellite mobile communication devices, amateur radios, fishery radios, etc. The advanced mobile phone service (AMPS) system is an analog type mobile communication system. In contrast, the CDMA and TDMA systems are digital type mobile communication systems.

FIG. 1 is a block diagram illustrating the construction of a conventional mobile radio communication system. Referring to FIG. 1, a mobile communication exchange 120 performs exchange functions and interacts with another mobile communication exchange. The mobile communication exchange 120 connects with a different communication network, such as a PSDN, and also controls a call termination/origination of a mobile terminal 100. In addition, the mobile communication exchange 120 informs the charging center 130 of charging information, such as a subscriber number, terminating number, call start time, call termination time, discount information and so forth, when the call is terminated in the mobile terminal 100. The charging center 130 calculates and manages telephone charges to provide the necessary charging information. For example, if thirty days elapse, the charging center 130 calculates an accumulated telephone charge for the calls made during the 30-day period for each mobile terminal subscriber, and notifies the respective mobile terminal subscriber of the total charge. A basic charge and a tax charge are added to the total telephone charge in the form of a bill 150.

According to the conventional mobile communication system described above, it can not know the call charge just after a mobile terminal subscriber terminates a telephone call. Also, there is no means for the mobile subscriber to instantly find out the current total telephone charge.

5 In order to solve the above problem, a mobile terminal having a built-in charging device has been developed. This charging device obtains call time information (i.e., call start time and call termination time) using a timer (not illustrated) provided in the mobile terminal. Typically, the timer is used to inform the mobile terminal subscriber of the call time through an output device (for example, a liquid crystal display) of the mobile terminal.

10 The timer starts its operation at the pointer of time when the mobile terminal detects a ring back tone transmitted to the mobile communication exchange, but there is a discrepancy between this time and an actual telephone call time. Thus, the telephone charge calculated by the charging device has an error in comparison to the telephone charge actually imposed on the mobile terminal subscriber by the vendor. Also, since the discount  
15 rate may be different according to the type of service enrolled in by the subscriber, an accurate telephone charge can not be known when such a discount rate is not considered. Furthermore, since the real bill contains a basic charge, a tax charge, and other charges not available till a subscriber receives the bill after, for example, 30 day billing cycle, the prior art mobile phone having the built-in timer does not given an accurate billing charge report.

## SUMMARY OF THE INVENTION

Accordingly, the present invention has been made in an effort to solve the problems occurring in the related art, and an object of the present invention is to provide a method for informing charging data to a mobile terminal in a mobile radio communication system which enables a mobile terminal subscriber to immediately confirm through his/her mobile terminal a telephone charge for a telephone call or a total telephone charge that is calculated by a charging center just after terminating the call.

It is another object of the present invention to provide a method of immediately confirming charging information that is managed by a charging center if the mobile terminal subscriber requests the confirmation of the charging information using the mobile terminal in a standby state.

In order to achieve the above objects, according to the embodiment of the present invention, there is provided a first method of informing a telephone charge to a mobile terminal subscriber in a mobile communication system, the method comprising the steps of a mobile communication exchange detecting termination of a telephone call of a mobile terminal, the mobile communication exchange producing charging information for the telephone call, the mobile communication exchange informing the charging information to a charging center, the charging center calculating the telephone charge using the charging information and informing the calculated telephone charge to the mobile communication

exchange, and the mobile communication exchange transmitting the telephone charge information to a mobile terminal.

In another aspect of the present invention, there is provided a second method of  
5 informing a total telephone charge to a mobile terminal subscriber in a mobile  
communication system, the method comprising the steps of a mobile terminal requesting  
confirmation of an accumulated telephone charge up to now or the total telephone charge to  
a mobile communication exchange in accordance with a command from the mobile  
terminal subscriber, the mobile communication exchange requesting the confirmation of the  
10 telephone charge for the mobile terminal subscriber to a charging center, the charging  
center informing the telephone charge to the mobile communication exchange, and the  
mobile communication exchange transmitting the telephone charge information to the  
mobile terminal.

## BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and advantages of the present invention will become more apparent by describing in detail the preferred embodiments thereof with reference to the attached drawings in which:

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FIG. 1 is a block diagram illustrating the construction of a conventional mobile radio communication system;

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FIG. 2 is a block diagram illustrating the construction of a mobile radio communication system incorporating the present invention;

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FIG. 3 is a flowchart illustrating a method of informing a mobile terminal of a telephone charge for a telephone call and the total telephone charge when the telephone call terminates according to an embodiment of the present invention; and,

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FIG. 4 is a flowchart illustrating a method of informing a mobile terminal of the total telephone charge in the case that the mobile terminal requests confirmation of the total telephone charge up to now in a standby state according to another embodiment of the present invention.



## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention will now be explained in detail with reference to the accompanying drawings. In the drawings, the same or similar elements are denoted by the same reference numerals even though they are depicted in different drawings. For the purpose of clarity, a detailed description of well known functions and configurations incorporated herein will be omitted as it may make the subject matter of the present invention unclear.

FIG. 2 is a block diagram illustrating the construction of a mobile radio communication system incorporating the present invention. Referring to FIG. 2, a mobile communication exchange 120 performs an exchange function and interacts with another mobile communication, or the exchange 120 connects with a different communication network, such as a PSDN, and controls the call termination/origination of a mobile terminal 100. In addition, the mobile communication exchange 120 informs the charging center 130 of charging information of a telephone call, such as the subscriber's number, terminating number, call start time, call termination time, discount information and so forth, when the call from the mobile terminal 100 terminates. The charging center 130 calculates and manages a telephone charge for the latest call, an accumulated telephone charge, and a total telephone charge using the charging information, then informs the respective telephone charges to the mobile communication exchange 120. Here, the management of the

telephone charges is effected in such a manner that if thirty days elapses, the charging center 130 calculates the accumulated telephone charge for the calls made during the specific period for each mobile terminal subscriber, and notifies the respective mobile terminal subscriber of the total charge via mail. The bill includes a basic charge, a tax  
5 charge, and the calculated telephone charge.

Also, the mobile communication exchange 120 transmits to the mobile terminal 100 the telephone charging information, such as the telephone charge for the latest call, the accumulated telephone charge, and the total telephone charges that are transferred from the charging center 130. The mobile terminal 100 receives the telephone charging information  
10 and displays the information on the display section (not illustrated), so that the mobile terminal subscriber can identify it.

The mobile communication exchange 120 may be provided with a short message generating section 140. This short message generating section 140 generates a short message which corresponds to the telephone charging information, such as the telephone  
15 charge for the latest call, the accumulated telephone charge, and the total telephone charge that are transferred from the charging center 130 in the form of a short message.

The types of telephone charges transferred from the charging center 130 can be selectively determined according to the request by the mobile terminal subscriber. Thus,

different telephone charge information including the latest call, the accumulated telephone charge, and the total telephone charge can be provided to the subscriber. For instance, the mobile terminal subscriber can be provided with the accumulated telephone charge for a duration of a specified time period that he/she desires from the charging center 130 using the mobile terminal 100. The type and the different telephone charge information transferred to the mobile terminal 100 may be predetermined or determined by the selection command from the mobile terminal subscriber. For example, the display unit of the mobile terminal can be pre-selected to display only the telephone charge for the latest call or only the total telephone charge, or both the latest call and the total telephone charge.

FIG. 3 is a flowchart illustrating a method of informing telephone charges to a mobile terminal for a telephone call and a total telephone charge call when the telephone call terminates according to the embodiment of the present invention.

With reference to FIG. 3, the mobile communication exchange 120 detects whether the telephone call from the mobile terminal 100 terminates (step 210). If the telephone call terminates, the mobile communication exchange 120 informs the charging center 130 of the charging information for the call, such as subscriber number, terminating number, call start time, call termination time, discount information, and so forth (step 220). The charging center 130 calculates the charge for the latest call and adds the calculated charge to the total telephone charge (step 230). The total telephone charge is calculated by adding up the

accumulated telephone charge for each mobile terminal as well as the basic charge and the tax charge within a specified time period, for instance, a thirty-day period.

The charging center 130 informs the mobile communication exchange 120 of the charge information for the latest call as well as the total charge (step 240). The mobile communication exchange 120 receives the charge information for the latest call and the total charge, converts the received information in the form of a short message using the short message generating section 140, and transmits the generated short message to the mobile terminal subscriber 100 (steps 250 and 260). The mobile terminal 100 then receives the short message and displays the charge information of the latest call and the total charge on the LCD of the mobile phone. Preferably, it may display characters such as “ Charge for the latest call: 400won, Total charge: 10,500won”. Accordingly, the mobile terminal subscriber can immediately confirm the charge for the latest call as well as the total charge calculated to include the latest call

FIG. 4 is a flowchart illustrating a method of informing a mobile terminal of the total telephone charge in the case that the mobile terminal requests confirmation of the total telephone charges up to now in a standby state according to another embodiment of the present invention.

With reference to FIG. 4, if the mobile terminal subscriber intends to verify the total telephone charge up to now in a standby state, he/she can request for the total charge, for example, by sequentially pressing keys “\*”, “1”, “1”, and “SEND”, or a specified key (step 310). If the mobile communication exchange 120 receives the request for the confirmation of the total charge for the mobile terminal 100 through the base station 110, the exchange 120 in turn requests the confirmation of the total charge of the mobile terminal subscriber to the charging center 130 (step 320). The charging center 130 searches the total charging information corresponding to the requesting mobile terminal subscriber and informs the mobile communication exchange 120 of the total charging information (step 330). The mobile communication exchange 120 generates a short message corresponding to the total charging information through the short message generating section 140 and transmits the short message to the mobile terminal 100 (steps 340 and 350). The mobile terminal 100 receives the short message, and displays the total charge on the LCD. Preferably, it may display characters such as “Total charge: 10,500 won (i.e. Korean currency)”.

As described above, it will be apparent that the present invention provides advantages in that the mobile terminal subscriber can be provided with an accurate telephone charge information by enabling the subscriber to immediately verify the charging information calculated by the charging center through the mobile terminal just after a telephone call. Also, the mobile terminal subscriber can selectively verify at least one type of charging information out of various charging information managed by the charging center as occasion demands using the mobile terminal.

While this invention has been described in connection with what is presently considered to be the most practical and preferred embodiments which display both the charge for the latest call and the total charge or only the total charge, it is to be understood that other modifications thereof may be made without departing from the scope of the invention. For example, the accumulated telephone charge for a specified time period desired by the mobile terminal subscriber, or another type of charge information other than the latest call and the total charge can be selectively displayed. Thus, the present invention should not be limited to the disclosed embodiment but should be defined by the scope of the appended claims and their equivalents.

**WHAT IS CLAIMED IS:**

1. A method for informing a telephone charge to a mobile terminal subscriber in a mobile communication system, the method comprising the steps of:

detecting, by a mobile communication exchange, a termination of a telephone call  
5 of a mobile terminal;

providing, by the mobile communication exchange, charging information responsive to the telephone call;

informing, by the mobile communication exchange, the charging information to a charging center;

10 calculating, by the charging center, the telephone charge using the charging information received from the mobile communication exchange and informing the calculated telephone charge to the mobile communication exchange; and,

transmitting, by the mobile communication exchange, the telephone charge information received from the charging center via a base station in communication with the mobile terminal.

2. The method as claimed in Claim 1, wherein the telephone charge represents a telephone service charge related to the telephone call made within a specified time period.

3. The method as claimed in Claim 1, wherein the telephone charge is at least one amongst a telephone charge for a latest call, an accumulated telephone charge, and a total telephone charge selected by the mobile terminal subscriber.

4. The method as claimed in Claim 1, wherein the charging information includes the number of the mobile terminal, a terminating party number, a call start time information, a call termination time information, and different billing qualification information.

5. The method as claimed in Claim 1, further comprising the step of receiving, upon receiving the telephone charge information by the mobile terminal, displaying the telephone charge information in a display unit of the mobile terminal.

6. The method as claimed in Claim 1, wherein the telephone charge information is in the form of a short message.



7. A method of informing a total telephone charge to a mobile terminal subscriber in a mobile communication system, the method comprising the steps of:

requesting, by a mobile terminal subscriber, a telephone charge to a mobile communication exchange;

5 upon receiving the telephone charge request, requesting, by the mobile communication exchange, the telephone charge for the mobile terminal subscriber to a charging center;

informing, by the charging center, the telephone charge to the mobile communication exchange; and,

10 transmitting, by the mobile communication exchange, the telephone charge received from the charging center via a base station in communication with the mobile terminal subscriber.

8. The method as claimed in Claim 7, wherein the mobile terminal requests the  
15 telephone charge during a standby state.

9. The method as claimed in Claim 7, wherein the telephone charge includes at least one of a telephone charge for a latest call, an accumulated telephone charge, and a total telephone charge.

**ABSTRACT OF THE DISCLOSURE**

Disclosed is a method of informing charging data to a mobile terminal in a code division multiple access (CDMA) type or time division multiple access (TDMA) type mobile radio communication system which enables a mobile terminal subscriber to immediately confirm the telephone charges of the mobile terminal. According to the method, a mobile communication exchange detects the termination of a telephone call by the mobile terminal, and the mobile communication exchange produces charging information for the telephone call and informs the charging information to a charging center. The charging center in turn calculates the telephone charge using the charging information received therein and informs the calculated telephone charge to the mobile communication exchange, and the mobile communication exchange transmits the telephone charge information to the mobile terminal.

FIG. 1  
(RELATED ART)

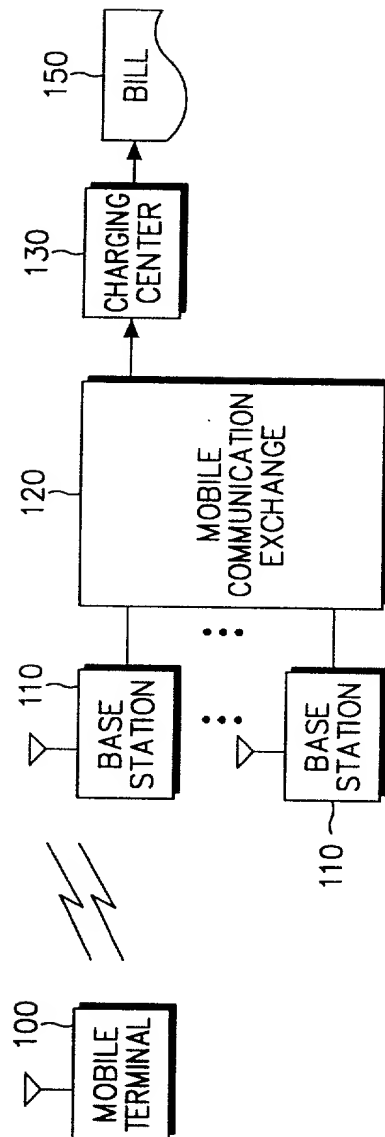
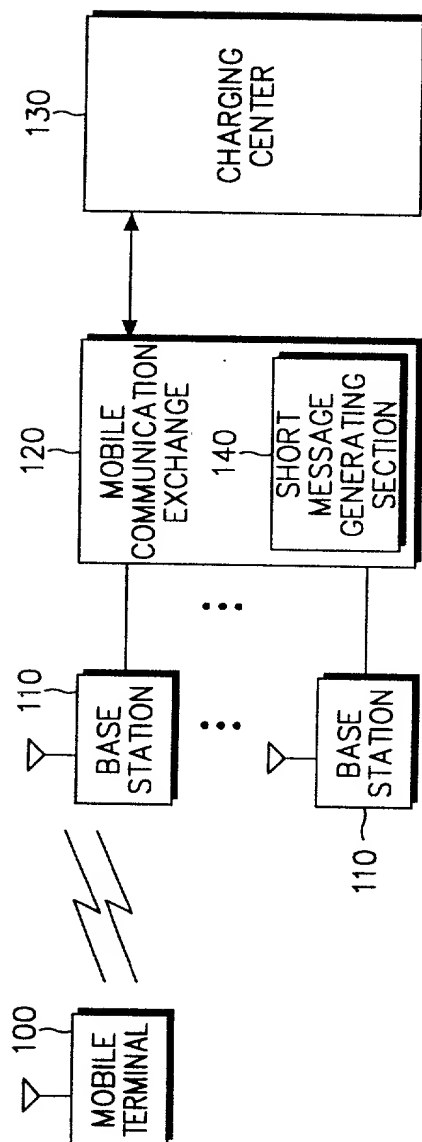


FIG. 2



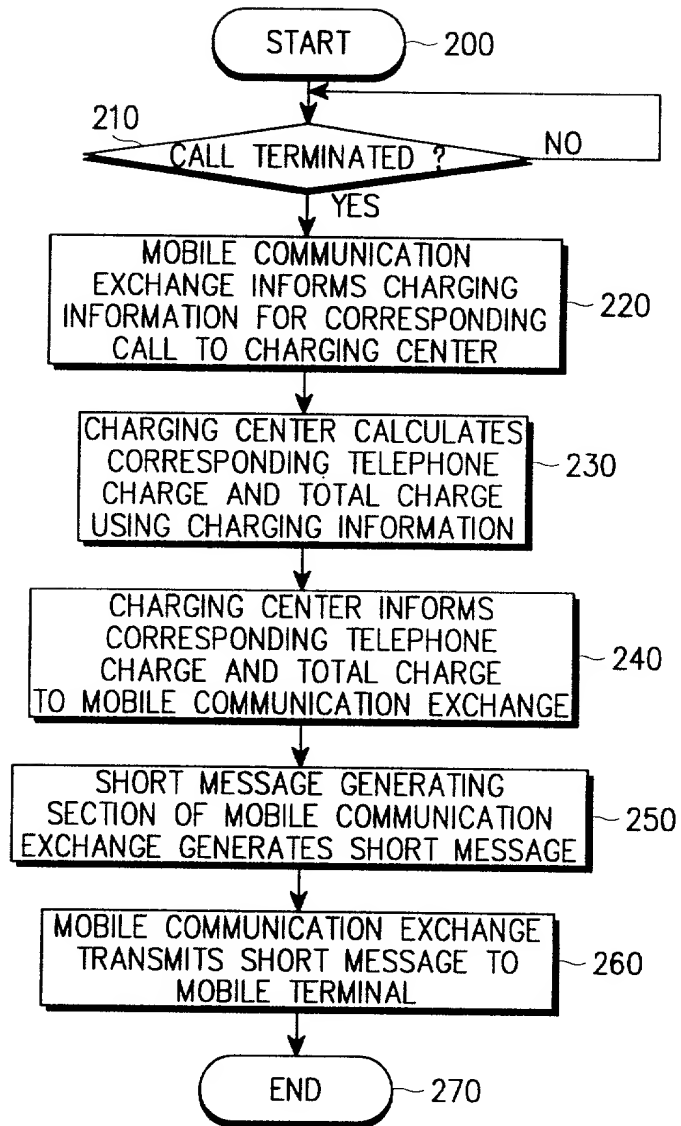


FIG. 3

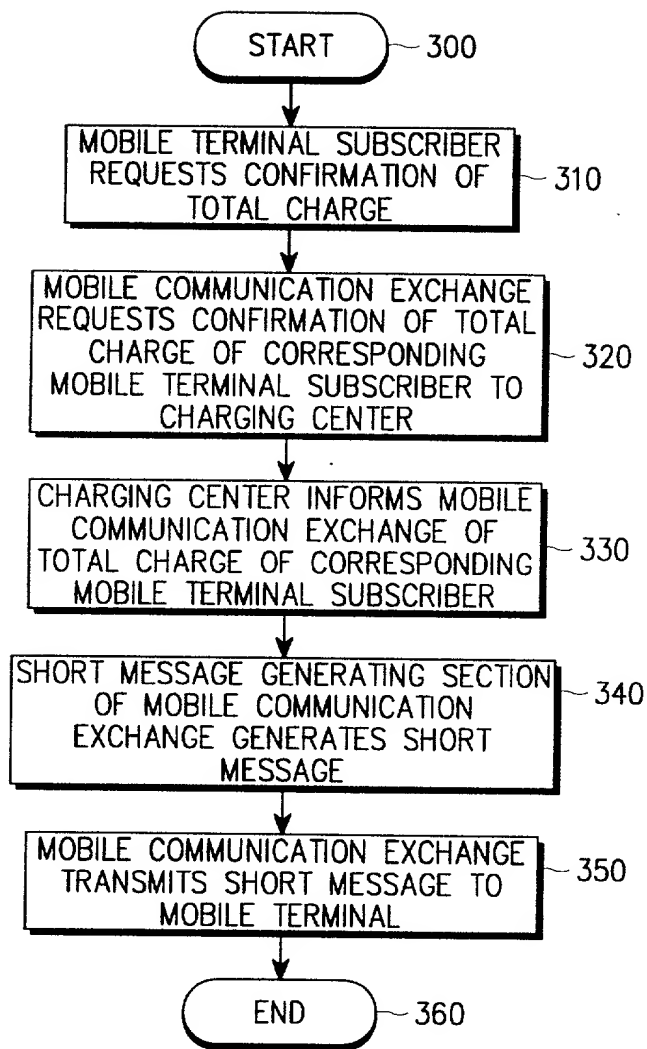


FIG. 4

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Young-Soo Park

Serial No: *Not yet assigned.*

Examiner: *Not yet assigned.*

Filed: August 30, 2000

Group: *Not yet assigned.*

For: METHOD OF INFORMING CHARGING DATA TO MOBILE TERMINAL IN  
MOBILE RADIO COMMUNICATION SYSTEM

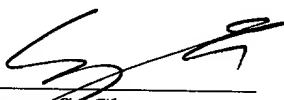
**TRANSMITTAL OF DECLARATION**

Assistant Commissioner for Patents  
Washington, DC 20231

Sir:

This transmittal accompanies a fax copy of Declaration with the signature by the inventors, for the above-captioned application. A substitute Declaration with the inventors' signature will be filed upon receipt of the Serial No. for the above-captioned application.

Respectfully submitted,

  
\_\_\_\_\_  
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Date: August 30, 2000

## DECLARATION AND POWER OF ATTORNEY

As a below named inventor (s), I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**METHOD OF INFORMING CHARGING DATA TO A MOBILE TERMINAL  
IN A MOBILE RADIO COMMUNICATION SYSTEM**

,the specification of which is attached hereto unless the following box is checked:

☐ was filed on \_\_\_\_\_ as United States Application Number or PCT International Application Number \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulation, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor=s certificate listed below and have also identified below any foreign application for patent or inventor=s certificate having a filing date before that of the application on which priority is claimed.

**Prior Foreign Application(s)**

<u>1999-38856</u> (Number)	<u>Republic of Korea</u> (Country)	<u>11/09/1999</u> (Day/Month/Year Filed)	Priority Claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	<input type="checkbox"/> Yes <input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of the Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulation, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

_____ (Application Number)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)
_____ (Application Number)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)



**POWER OF ATTORNEY:** I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: **Steve S. Cha**, Registration No. 44,069; **Howard S. Relter**, Registration No. 20,394.

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I (we) hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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**Citizenship:** Republic of Korea

**Date:** AUGUST 29, 2000

**Signature:** X Y. S. Park

**Full name of second inventor:**  
**Residence Address:**  
**Post office address:** Same as above  
**Citizenship:** Republic of Korea

**Date:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Full name of third inventor:**  
**Residence Address:**

**Post office address:**  
**Citizenship:**

**Date:** \_\_\_\_\_

**Signature:** \_\_\_\_\_